

Name: _____

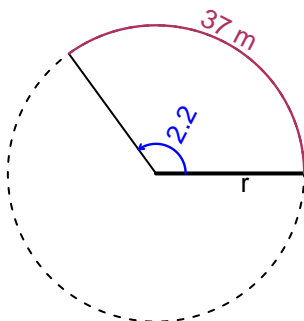
Date: _____

Trig Final (SLTN v629)

- You should have a calculator (like [Desmos](#)) and a [unit-circle](#) reference sheet.

Question 1

In the figure below, we see a circle and a central angle that subtends an arc. The arc length is 37 meters. The angle measure is 2.2 radians. How long is the radius in meters?

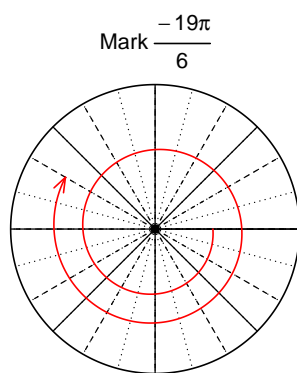


$$\theta = \frac{L}{r} \quad r = \frac{L}{\theta} \quad L = r\theta$$

$r = 16.82$ meters.

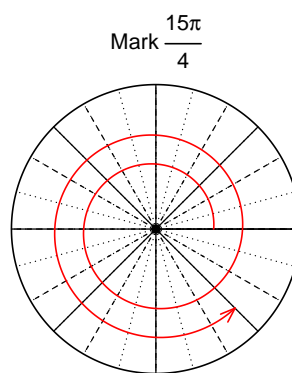
Question 2

Consider angles $-\frac{19\pi}{6}$ and $\frac{15\pi}{4}$. For each angle, use a spiral with an arrow head to **mark** the angle on a circle below in standard position. Then, find **exact** expressions for $\sin\left(-\frac{19\pi}{6}\right)$ and $\cos\left(\frac{15\pi}{4}\right)$ by using a unit circle (provided separately).



Find $\sin(-19\pi/6)$

$$\sin(-19\pi/6) = \frac{1}{2}$$



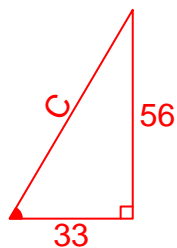
Find $\cos(15\pi/4)$

$$\cos(15\pi/4) = \frac{\sqrt{2}}{2}$$

Question 3

If $\tan(\theta) = \frac{-56}{33}$, and θ is in quadrant II, determine an exact value for $\cos(\theta)$.

Ignore any negatives and the quadrant, and draw a right triangle (based on SOHCAHTOA) in standard (quadrant I) orientation.



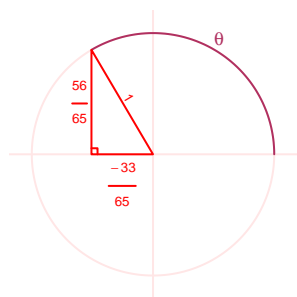
Solve the Pythagorean Equation

$$33^2 + 56^2 = C^2$$

$$C = \sqrt{33^2 + 56^2}$$

$$C = 65$$

Rescale the triangle so the hypotenuse is 1. Reflect the triangle into Quadrant II in a unit circle.



$$\cos(\theta) = \frac{-33}{65}$$

Question 4

A mass-spring system oscillates vertically with a frequency of 2.22 Hz, an amplitude of 7.33 meters, and a midline at $y = -4.06$ meters. At $t = 0$, the mass is at the maximum height. Write an equation to model the height (y in meters) as a function of time (t in seconds).

Any of these equations would get full credit.

$$y = 7.33 \cos(2\pi 2.22t) - 4.06$$

or

$$y = 7.33 \cos(4.44\pi t) - 4.06$$

or

$$y = 7.33 \cos(13.95t) - 4.06$$